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Application No.: 10/718,897

Docket No.: JCLA11797-R

JUL 05 2006

REMARKSPresent Status of the Application

The Office Action rejected claims 15, 16 and 21 under 35 U.S.C. 102(e), as being anticipated by Besser et al. (U.S. 6,689,689). The Office Action rejected claims 17-20 and 22-23 under 35 U.S.C. 103(a) as being unpatentable over Besser in view of Maiz (US 6,794,755).

Applicants have amended claim 15 and canceled claim 21 to more clearly define the present invention. After entry of the foregoing amendments, claims 15-20 and 22-23 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Rejections under 102(e)

Applicants respectfully traverse the 102(e) rejection of claims 15 and 16 because Besser et al. (U.S. 6,689,689) does not teach every element recited in these claims.

In order to properly anticipate Applicants' claimed invention under 35 U.S.C 102, each and every element of claim in issue must be found, "either expressly or inherently described, in a single prior art reference". "The identical invention must be shown in as complete details as is contained in the claim. Richardson v. Suzuki Motor Co., 868 F. 2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." See M.P.E.P. 2131, 8th ed., 2001.

The present invention is in general related a structure of metal interconnects as claim 15 recites:

Claim 15. A structure of metal interconnects, comprising:
a first dielectric layer, having a first opening therein;
a first metal layer, formed in the first opening; and
a first protective layer, formed on the surface of the first metal layer not covered by the first dielectric layer, wherein the first protective layer is formed from a mixture of the first metal layer and a first film layer, the first film layer is reactive with the first metal layer but non-

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reactive with the first dielectric layer, and a top surface of the first dielectric layer around the first opening is exposed, *wherein the first film layer is comprised of a non-conductive material.*

Besser fails to teach or suggest the protective layer is formed from a mixture of the first metal layer and *a first film layer comprised of a non-conductive material.* In the Besser reference, as shown in Fig. 2, the thin layer 7 formed on the metal 5 is a layer of cobalt alloy element (see col. 10, lines 1-2) or a layer comprising number of alloying element(s) or two or more layers including alloying element (see col. 10, lines 31-40). In other words, *the thin layer 7 disclosed by Besser is a conductive layer.* Besser does not teach the thin layer 7 can be a non-conductive layer. However, in the present invention the first protective layer formed on the surface of the first metal layer is formed from a mixture of the first metal layer and a first film layer, the first film layer being reactive with the first metal layer but non-reactive with the first dielectric layer and a top surface of the first dielectric layer around the first opening being exposed, *wherein the first film layer is comprised of a non-conductive material.*

Therefore, Applicant respectfully submits Besser does not teach each and every element in claim 15. Independent claim 15 patently define over the prior art reference, and should be allowed. For at least the same reasons, dependent claim 16 patently define over the prior art as well.

Rejections under 103(a)

The Office Action rejected claims 17-20 and 22-23 under 103(a) as being unpatentable over Besser in view of Maiz(US 6,794,755). Applicant respectfully traverses the rejection for at least the reasons set forth below.

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To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must "be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. 2143, 8th ed., February 2003.

Applicants submit that, as disclosed above, Besser fails to teach or suggest each and every element of claim 15, from which claims 17-20 and 22-23 depend. Maiz also fails to teach or suggest the first protective layer formed on the surface of the first metal layer is formed from a mixture of the first metal layer and a first film layer, the first film layer being reactive with the first metal layer but non-reactive with the first dielectric layer and a top surface of the first dielectric layer around the first opening being exposed, *wherein the first film layer is comprised of a non-conductive material*. Maiz cannot cure the deficiencies of Besser. Therefore, the two references combined do not teach each and every element in claim 15. Independent claim 15 is patentable over the prior art references, and should be allowed, its dependent claims 17-20 and 22-23 patently define over the prior art as a matter of law.

In particular, because the first film layer is comprised of a non-conductive material in the present invention, a Cu barrier layer made of SiN, SiCN or SiCO is not needed to be formed in the structure, and thus the total capacitance of the structure of metal interconnects of the present invention is reduced. Moreover, because the first film layer is comprised of a non-conductive material in the present invention, line-to-line leakage, that is current leakage between two

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adjacent structures of metal interconnect, can be avoided, especially for the device having smaller line pitch.

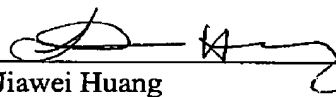
CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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